

Temperature Controller Relay

CE 7UG0
IEC 60947-5-1



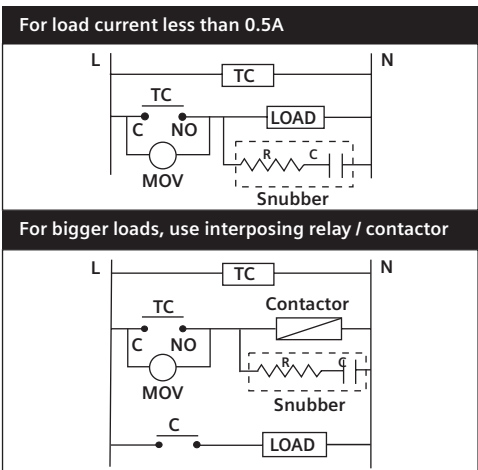
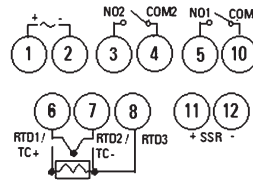
Please read and understand these instructions before installing, operating, or maintaining the equipment.

	DANGER Hazardous voltage can cause death or serious injury. Disconnect power before working on equipment.
	CAUTION Reliable functioning of the equipment is only ensured with certified components. Overvoltage category III (Refer IEC 60947-1)
NOTICE This product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may require to take adequate mitigation measures.	

Technical Data

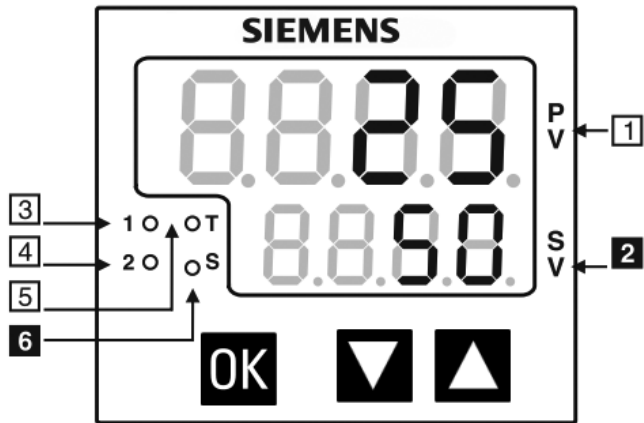
Designation	7UG0 480-11U20
Type	Temperature controller relay
Control voltage	85 - 270V AC/DC (±15%), 50/60Hz
Operating conditions	0 to 50°C, upto 95%RH (non-condensing)
Input Sensors	Thermocouple (J,K,T,R,S) / RTD (PT100)
Filter time	0.2 to 10 sec
Digital output for external SSR	12VDC, 50mA
Accuracy	For J,K,T inputs: ±(2% of setting + 1°) For R,S inputs: ±(2% of setting + 2°) For RTD inputs: ±(2% of setting + 1°) (20 min of warm up time for TC inputs)
Control action	1. PID control with auto or self tuning 2. ON - OFF control 3. Heat - Cool with auto tuning
Propositional band (P)	0°C to 400°C / 1.0°F to 750°F
Integral time (I)	0 to 9999 sec
Derivative time (D)	0 to 9999 sec
Cyclic time	0 to 99.9 sec
Hysteresis width	0.1 to 99.9°
Dwell timer	0 to 9999 min
Manual reset value	-19.9 to 19.9°
Heat Cool PID	Control Method: PID Proportional band - Cool: 0 to 400°C Cyclic time - Cool: 0.1 to 99.9sec Dead band: Programmable from setpoint low limit to setpoint high limit
Power consumption @ 230V AC	6VA
Rated current of relay output (@250VAC)	5A (AC12), 2A (AC15)
SCPD for relay output (For Short circuit current of 1kA as per IEC 60947-5-1)	6A, gL, HRC fuse

Terminal connections



	7UG048...
	0.5 Nm
	1 x (0.75 to 2.5) mm ² 2 x 0.5 to 2 x 1.5 mm ²
	1 x (0.5 to 2.5) mm ² 2 x (0.5 to 1.5) mm ²

Front Panel Description:



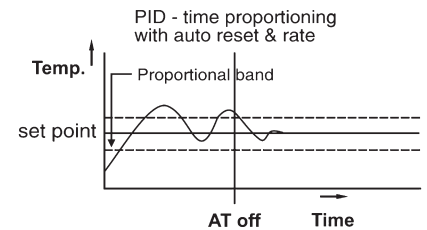
1	Process-value (PV) / Parameter name display	1) Displays a process value (PV). 2) Displays the parameter symbols at configuration mode/online menu. 3) Displays PV error conditions. (refer Table 2)
2	Parameter setting display	Displays the parameter settings at configuration mode/online menu.
3	Control output 1 indication	The LED is lit when the control output 1 is ON
4	Control output 2 indication	The LED is lit when the control output 2 is ON
5	Tune	Auto tune : Blinking (With faster rate) Self tune : Blinking (With slower rate)
6	Dwell timer	Blinking : Dwell timer is in progress. Continuous ON : Time over.

User Guide

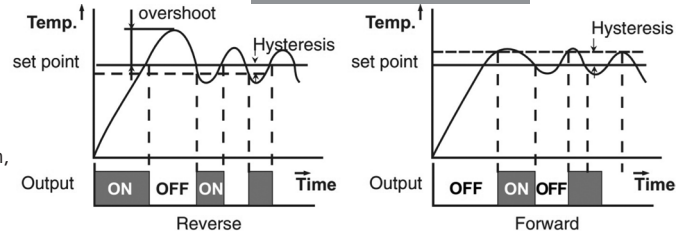
- Display Bias:** This function is used to adjust the PV value in cases where it is necessary for PV value to agree with another recorder or indicator, or when the sensor cannot be mounted in correct location.
- Filter Time Constant:** The input filter is used to filter out quick changes that occur to the process variable in a dynamic or quick responding application which causes erratic control. The digital filter also aids in controlling processes where the electrical noise affect the input signal. Larger the value of FTC entered, greater the filter added and slower the controller reacts to the process and vice-versa.
- Manual Reset (for PID control & I = 0):** After sometime the process temperature settles at some point and there is a difference between the set temperature and the controlled temperature. This difference can be removed by setting the manual reset value equal and opposite to the offset.
- Dwell Timer:** A dwell timer is used to control a process at a fixed temperature for a defined period. Once the process reaches the setpoint, dwell timer starts to count from zero until time out. After the time is completed, control output goes OFF and auxiliary output energises as an alarm.
- Auto tuning (AT):** The Auto-tuning function automatically computes and sets the proportional band (P), integral time (I), Derivative time (D), ARW% and cycle time (CYC.T) as per process characteristics.
 - While Auto-tune is in progress, 'T' LED will blink at a faster speed.
 - After Auto-tuning is completed, the 'T' LED stops blinking
 - If the power goes OFF before auto-tuning is completed, auto-tuning will be restarted at next power ON.
 - If auto-tuning is not completed after 3-4 cycles, it is suspected to fail. In this case, check the wiring & parameters such as the control action, input type, etc.
 - Carry out the auto-tuning again, if there is a change in setpoint or process parameters.
- ON/OFF control action (For Reverse Mode):** The relay is 'ON' up to the set temperature and cuts 'OFF' above the set temperature. As the temperature of the system drops, the relay is switched 'ON' at a temperature slightly lower than the set point.

HYSTERESIS: The difference between the temperature at which relay switches 'ON' and at which the relay switches 'OFF' is the hysteresis or dead band.
- Self tune (ST):** It is used where modification of PID parameters is required repeatedly due to frequent change in process condition eg. Setpoint
 - When Self-tuning is in progress, 'T' LED blinks at slower rate
 - At the completion of self-tuning, 'T' LED stop blinking.
 - Self tuning is initiated under the following conditions:
 - When setpoint is altered.
 - When tune mode is altered (TUNE = ST)
 - ST will start only if PV < 50% of setpoint.
 - ST will work only when ACT = RE.

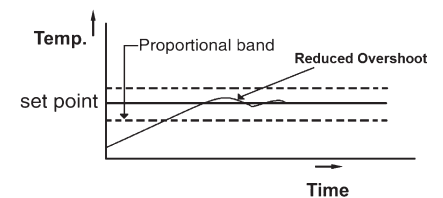
Auto tuning (AT)



ON/OFF Control action



Self tune (ST)

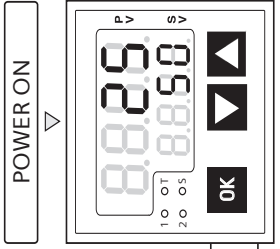


CONFIGURATION INSTRUCTIONS

KEY FUNCTIONS

- Press once to view online parameters
- Press for 3 sec to enter Level 2
- Press once to view previous parameter in configuration menu
- Press for 3 sec to enter protection Level
- Allows the user to increase or decrease associated parameter value
- To exit configuration menu press any of these keys for 3 sec

OPERATIONAL MENU



Press **OK** + **▲** keys for 3sec.

Press **▲** key for 3sec.

Press **▲** key for 3sec.

Level 1				
Display	Description	Default Value	Range	Display Condition
i n P E	Input type (Refer Table 1)	J	J/K/T/RS/RTD	—
r E S L	Display Resolution	i	1/0.1	Not prompted for R & S type
U n i E	Temperature unit	°C	°C/°F	—
S P L L	Set point low limit	-199	Min range of sensor selected to SPHL	—
S P H L	Set point high limit	750	SPH to Max range of sensor selected	—
F E C	Filter time constant	i.0	0.2 to 10.0 sec	—
R E F 1	Control action for relay 1	r E	RE/FD	Not prompted for HC=YES
C n L 1	Control logic	P i d	PID/ONF	—
Q U E	Control Output selection	r L y	RELAY/SSR	—
d w E L	Dwell mode enable	n O	NOYES	—
H C	Heat-cool mode selection	n O	NOYES	—
R C E 2	Control action for relay 2	r E	RE/FD/TIME	When HC=NO, TIME prompted when DWEL=YES
n O d 2	Relay 2 type	d E U	DEVI/ABS	When ACT2=RE/FD
Q n L	Online menu for time	r E n n	REMN/ELPS	When DWEL=YES
R r y	Anti-reset windup %	25.0	1.0 to 100.0%	When CNTL=PID
r S E	Factory default (Reset all)	n O	NOYES	—

Level 2				
Display	Description	Default Value	Range	Display Condition
t u n E	Tune (Refer user guide)	5 E	OFF / ST / AT	For CNTL=PID
P	Proportional band	i.0	1.0 to 400.0°	For CNTL=PID
i	Integral time	i.2.0	0 to 9999 sec	For CNTL=PID
d	Derivative time	3.0	0 to 9999 sec	For CNTL=PID
C y C n	Cycle time mode	A U E 0	AUTO/USR.F	For CNTL=PID
C y C t	Cycle time	15.0	0.1 to 99.9 sec	For CNTL=PID
H y S i	Hysteresis 1	i.0	0.1 to 99.9°	For CNTL=ONF
n n L r	Manual reset	0.0	-19.9 to +19.9°	For CNTL=PID & I=0
P b C	Proportional band-cool	i.0	1.0 to 400.0°	For CNTL=PID & HC=YES
C y C c	Cycle time-cool	15.0	0.1 to 99.9 sec	For CNTL=PID & HC=YES
H y S 2	Hysteresis 2	i.0	0.1 to 99.9°	For HC=NO or HC=YES & CNTL=ONF
t i n E	Dwell time	0 F F	OFF, 1 to 9999 min	When DWEL=YES
d S P b	Display bias	0.0	-19.9 to 19.9°	—

Protection Level				
Display	Description	Default Value	Range	Display Condition
S P 1	Lock setpoint 1	U n L L	UNLK/LOCK	—
S P 2	Lock setpoint 2	U n L L	UNLK/LOCK	—
L U L 1	Lock level 1	U n L L	UNLK/LOCK	—
L U L 2	Lock level 2	U n L L	UNLK/LOCK	—
d w E L	Lock dwell time	U n L L	UNLK/LOCK	Prompted when DWEL=YES

Note

- Locking parameters (LVL1 or LVL2 or SP or DWEL) will not permit change in the value of respective level parameters. Time value (Online) can be altered only when DWEL is not locked in protection level.
- Continuous operation of **OK** + **▲** keys for SP or other parameters makes update speed faster in 3 stages after 3 sec.

Note : At power ON lower display shows (momentary) input type selected in Level 1.

Table 1 : INPUT RANGE

FOR RTD

INPUT TYPE	RANGE		
	Resolution: 1	Resolution: 0.1	UNIT
Pt100	-150 to 850	-150.0 to 850.0	°C
	-238 to 1562	-199.9 to 999.9	°F

FOR THERMOCOUPLE

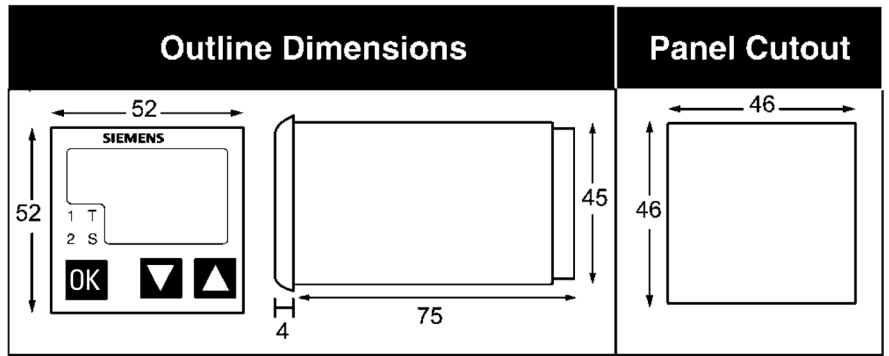
INPUT TYPE	RANGE		
	Resolution: 1	Resolution: 0.1	UNIT
J	-199 to 750	-199 to 750	°C
	-328 to 1382	-199 to 999	°F
K	-199 to 1350	-199 to 999	°C
	-328 to 2462	-199 to 999	°F
T	-199 to 400	-199 to 400	°C
	-328 to 750	-199 to 750	°F
R, S	0 to 1750	N/A	°C
	32 to 3182	N/A	°F

Table 2 : ERROR DISPLAY

When an error has occurred, the upper display indicates error codes as given below.

Error	Description	Control Output Status
S.b 0	Sensor break / Over range condition	OFF
S.0 E	Sensor reverse / Under range condition	OFF

Dimensional drawings



Disposal

Siemens products are environment friendly, which predominantly consist of recyclable materials.

For disposals we recommend disassembling and separation into following materials:

METALS: Segregate into Ferrous & Non Ferrous types for recycling through authorised dealer.

PLASTICS: Segregate as per material type for recycling through authorised dealer. Because of the long lifetime of Siemens products the disposal guidelines may be replaced by other national regulations when taking the product out of service.

The local customer care service is available at any time to answer disposal-related questions